Scientific publications

These publications are contributed by staff of laboratories and plants which form part of or cooperate with enterprises of the Philips group of companies, particularly by staff of the following research laboratories:

Philips Research Laboratories, Eindhoven, The Netherlands
Philips Research Laboratories, Redhill, Surrey, England
Laboratoires d'Electronique et de Physique Appliquée, 3 avenue Descartes, 94450 Limil-Brévannes, France
Philips GmbH Forschungslaboratorium Aachen, Weißhausstraße, 51 Aachen, Germany
Philips GmbH Forschungslaboratorium Hamburg, Vogt-Kölln-Straße 30, 2000 Hamburg 54, Germany
Philips Research Laboratory Brussels, 2 avenue Van Becelaere, 1170 Brussels (Boitsfort), Belgium
Philips Laboratories, N.A.P.C., 345 Scarborough Road, Briarcliff Manor, N.Y. 10510, U.S.A.


C. T. Foxon & B. A. Joyce: Interaction kinetics of As₂ and Ga on {100} GaAs surfaces. Surface Sci. 64, 293-304, 1977 (No. 1).

K. G. Freeman: Experimental direct broadcast reception of 12 GHz television signals from the Canadian Communications Technology Satellite.

Radio and electronic Engr. 47, 234-236, 1977 (No. 5).

Y. Genin & Y. Kamp: Comments on 'On the stability of the least mean-square inverse process in two-dimensional digital filters'.


J. Physique 38, C1/47-50, 1977 (Colloque CI).


J. Physique 38, C1/317-320, 1977 (Colloque CI).


H. B. Haanstra & H. Ihrig: Voltage contrast imaging of PTC-type BaTiO3 ceramics having low and high titanium excess.


P. Hansen: Magnetostriction of Fe71 ions in yttrium iron garnet.


P. Harrop, R. Dessert & P. Baudet: Performance of some GaAs MESFET mixers.


J. C. M. Henning & H. van den Boom: Determination of exchange parameters of Cr3+ pairs in MgAl2O4 by optical and ESR measurements.


H. Ihrig & W. Puschert: A systematic experimental and theoretical investigation of the grain-boundary resistivities of n-doped BaTiO3 ceramics.


J. E. Knowles: Permeability mechanisms in manganese zinc ferrites.


G. Kowalski: Reconstruction of objects from their projections. A simple reconstruction algorithm, theoretical and simulation studies.

EDV in Medizin und Biologie 8, 1-8, 1977 (No. 1).

G. Kowalski: Reconstruction of objects from their projections. The influence of measurement errors on the reconstruction.


B. M. Kramer, A. C. Derycke*, C. F. Masse & P. A. Rolland* (* Université de Lille I): High conversion efficiency frequency multiplier using GaAs avalanche diodes.


H. K. Kuiken: Solidification of a liquid on a moving sheet.


Appl. Phys. 12, 355-368, 1977 (No. 4).

W. Kwestroo, H. C. A. van Gerven & H. A. M. van Hal: The hydrogarnets Ba3In2(OH)12 and Ba3Sc2(OH)12.


W. Kwestroo, H. C. A. van Gerven & C. Langereis: Compounds in the system BaO-In2O3.


Solid State Comm. 21, 775-778, 1977 (No. 8).


C. L. Sam & M. M. Choy: Mixing of Ne laser and dye laser pulses in ADP to generate difference frequency tunable from 0.68 to 1.1 μm. Appl. Phys. Letters 30, 199-201, 1977 (No. 4).


J. L. Sommerdijk, A. Bril & F. M. J. H. Hoex-Strik: Luminescence of Eu²⁺-activated Cs(Ca, Mg)F₃ and Rb(Ca, Mg)F₃. J. Luminescence 15, 115-118, 1977 (No. 1).


Recent United States Patents

Abstracts from patents that describe inventions from the following research laboratories that form part of or cooperate with the Philips group of companies:

Philips Research Laboratories, Eindhoven, The Netherlands
Philips Research Laboratories, Redhill, Surrey, England
Laboratoires d'Electronique et de Physique Appliquée, 3 avenue Descartes, 94450 Limeil-Brévannes, France
Philips GmbH Forschungslaboratorium Aachen, Weißhausstraße, 51 Aachen, Germany
Philips GmbH Forschungslaboratorium Hamburg, Vogt-Kölln-Straße 30, 2000 Hamburg 54, Germany
Philips Research Laboratory Brussels, 2 avenue Van Becelaere, 1170 Brussels (Boitsfort), Belgium
Philips Laboratories, N.A.P.C., 345 Scarborough Road, Briarcliff Manor, N.Y. 10510, U.S.A.

4 092 208
Method of growing single crystals of rare earth metal iron garnet materials
J. C. Brice
J. M. Robertson
A method of growing monocristalline bismuth rare earth iron garnet, either as a single crystal or as an epitaxial layer, from a solution containing composing components of the garnet together with a flux. The flux consists essentially of a mixture of Bi$_2$O$_3$ and RO$_2$, wherein R is at least one of the elements Si, Ge, Ti, Sn, Zr, Ce and Te, wherein the system Bi$_2$O$_3$—RO$_2$ includes a eutectic composition having a eutectic temperature which is below the melting temperature of pure Bi$_2$O$_3$. By using these Bi$_2$O$_3$—RO$_2$ fluxes, the monocristalline garnets produced have lower optical absorption coefficients at, for example 5100 Å and 5600 Å than similar garnets grown using lead-containing fluxes. Furthermore higher growth rates and higher growth temperatures are possible when using the Bi$_2$O$_3$—RO$_2$ fluxes rather than lead-containing fluxes.

4 099 840
Multilayer reflector for gas discharge laser
J. van der Wal
W. A. J. Gielens
J. M. M. Pasmans
A multilayer reflector of which the last layer most remote from the substrate and having a high refractive index is vapor-deposited from a mixture containing a metal or oxide of an element from group 4b of the periodic table and a metal oxide from the group of beryllium oxide, magnesium oxide and calcium oxide, is particularly resistant to hydrogen and ultraviolet light and is hence suitable for application in a laser which is to have a long life.

4 100 378
Cross-correlation arrangement
T. A. C. M. Claasen
J. B. H. Peek
Cross-correlation arrangement for determining the presence or absence of a signal $x(t)$ of known frequency in an unknown signal $x(t)$ if this signal $x(t)$ is present for at least a period of time $T$, with an unknown starting instant. An auxiliary signal $a(t)$ is added to the signal $x(t)$. The sum signal is converted into one-bit code words $y_{	ext{sum}}(kT)$ which are stored in a storage medium having at least $2^N$ addressable storage locations. The code words $y_{	ext{sum}}(kT)$ are elements of a series $(y_{	ext{sum}}(kT))$ which is formed by the code words which occur in a predetermined time interval having a length NT which are of a nonperiodical signal of the form $x(t) + a(t)$. The product code words obtained are added together in an integrator. This integrator is read each time after a time interval $NT$ and resets. The absolute value of an output code word of the integrator is optionally added to corresponding code words of other correlation channels. The sum code words obtained in this way are integrated in a second integrator whose contents is continuously compared with a detection level. If $N_2 = T/N$, $N$ is smaller than $N_2$ for example a factor of 3. The value of $N$ determines the width of the detection characteristic.
A device for analysing a surface layer by means of ion scattering

H. H. Brongersma

A device for analysing a surface layer by means of ion scattering. The device comprises an energy selector having two coaxial cylindrical electrodes. A primary mono-energetic ion beam impinges upon the surface layer and its axis coincides with the axis of the cylindrical electrodes. Back-scattered ions, the paths of which lie on a conical surface having an apical angle of 180° reduced with the scattering angle, are selected for energy and detected.

Device for converting solar energy

H. Durand
G. J. Naaijer

A device is described for converting solar energy into electric power for a load, which device is provided with photocells and electric accumulators. Switching means are provided which at least during starting of the load connect this load to the output terminals of the array of photocells so that during starting the current through the load is determined by the current supplied by the photocells. The device makes efficient use of the available solar radiation, is of simple design and is reliable.

Current stabilizing arrangement

R. J. van de Plassche

A current stabilizing arrangement includes a first and a second current circuit or path in which currents with a mutually fixed ratio are maintained. These currents respectively flow through the series connection of a first semiconductor junction in series with a resistor and a second semiconductor junction. The voltage across the second semiconductor junction is maintained equal to the voltage across said series connection, which results in currents which are linearly dependent on the temperature. In order to add a component with a positive second-order temperature dependence to these currents so as to enable a negative second-order temperature dependence to be compensated for in the case where the arrangement is used as a voltage or current reference source, the current stabilizing arrangement comprises a transistor whose base-emitter junction constitutes said second semiconductor junction, the base circuit of said transistor including a resistor.

Voltage-current converter

R. J. van de Plassche

A voltage-current converter having a balanced-voltage input and a balanced-current output. Each of the emitter circuits of the two input transistors includes a three-transistor current-mirror circuit, whose input circuit carries a constant current, whose output circuit carries the balanced-output current and of which the base-emitter junction of the transistor which is included in the input circuit is bridged by a semiconductor junction in the output circuit. The two current mirror circuits are coupled in that a resistor is included between the bases of the transistors which are included in the input circuits of the two current mirror circuits.

Transmission system for signal transmission by means of compressed delta modulation

E. C. Dijkmans
K. E. Kuijk

Transmission system for signal transmission by means of compressed delta modulation provided with leaking integrators in the delta modulator and demodulator, the leaking integrator in the modulator being connected in series with the capacitor of large capacitance between the terminals of a signal source having controlled current sources for reducing the noise and distortion produced by the modulator.

Dynamic control of code modulated pulse transmission

H. P. J. Boudewijns
K. Riemen
L. D. J. Eggemont

A transmission system for the coded transmission of information signals in which the transmitter and receiver comprise a dynamic control circuit, in which a signal generator is included for supplying a dynamic control signal. When a pulse train analyzer which analyzes the transmitted pulse train delivers a series of one-pulses, an exponential variation of the dynamic control signal is obtained by actuating a feedback circuit which applies the dynamic control signal to the input of the signal generator.

Facsimile system

H. H. H. Groothuis

A facsimile system including a picture pick-up arrangement in which the picture information to be transmitted is processed in separate groups of picture elements. The information of a first number of adjacent lines and a second number of adjacent picture elements is applied to a picture element comparison circuit. When only white information occurs in a group of picture elements thus formed this picture element group is represented by a logical 1. When there is black information in the picture element group an instantaneous derived code signal is formed with a logical 0 followed by a number of bits suitable for picture element coding. A considerable bit reduction is the result as compared with a one-bit representation per picture element. A specific choice of a clock pulse frequency results in a simple signal coding.

Thin-film magnetic head for reading and writing information

G. J. Koel
F. W. Gorter
J. T. Gerkema

A thin-film magnetic head for writing information in and reading information from a track of a magnetic recording medium in which the head comprises a magnetically permeable yoke having two limbs between which a writing and reading gap is formed. In a construction in which the limbs of the yoke are opposite to each other, one limb is interrupted by a gap which is bridged by a magneto-resistive reading element. In a construction in which the limbs of the yoke overlap each other at the area of the writing/reading gap, they are bridged by a magneto-resistive reading element in another place.

Hot-gas engine

A. P. J. Michels

A hot-gas engine in which the supply of fuel to the burner device is controlled by means of a control signal which is derived from a differential pressure signal which represents the volume flow of combustion air and which is corrected for variations in temperature and pressure of the ambient air.
Method for producing a low-pressure gas discharge lamp
P. J. W. Jochems
J. van Esdonk
J. Hasker
J. C. G. Vervest

A method for producing a low-pressure gas discharge lamp in which a body of a solid material having a thin structure of filaments permeable to the gas discharge such as glass wool is disposed. Coherence is given to the filaments by compressing them whereafter they are sucked into the lamp envelope. Compressing, knitting together and producing the wire-shaped elements is done in a funnel-shaped space which is connected at its constricted side to the tubular discharge space.

Method of manufacturing a semiconductor device
E. Kooi
P. J. W. Jochens
A. T. van Zanten

In LOCOS N-channel MOST-IC's underpasses can be obtained below the LOCOS pattern by performing, at the area where the underpasses are to be formed, an As or Sb implantation prior to providing the LOCOS. By using the nitride mask as an implantation mask, the LOCOS and the source/drain zones of the transistors can be provided in a self-registering manner with respect to the underpasses.

Apparatus for mechanically supporting a medical device in a plane
W. Schmedemann

Apparatus comprising a parallelogram which is movable in one plane and which is formed by a first and a second coupling rod and a part of a first and a second supporting rod for a medical device and a counterweight therefor, respectively. The coupling rods are pivotably connected near one end to the first supporting rod and are pivotably connected to the second supporting rod near their other end. The parallelogram is pivotable about a stationary shaft which extends perpendicularly to the plane of movement. This shaft is situated between the two pivots of a coupling rod.

Adjustable mount for electrostatic printer stylus within cylindrical printing roller
H.-D. Hinz
U. Rothgordt
F. Schinke

An electrode stylus which is arranged in an aperture of a rotatable printing roller is secured in a cylindrical inlet of the roller by means of an electrode holder. The electrode holder comprises a constricting in the center, so that it is sub-divided into an adjusting portion which supports the electrode and which can be slightly bent, by means of adjusting screws, transversely of the jet surface of the roller, and a fixing portion which can be fixed in an aperture in the insert by means of a fixing screw. The adjustment of the height of the stylus is effected, after the loosening of the fixing screw, by an arm which can be inserted into the insert and which is radically pivotable therein relative to the roller axis. Microscopic adjustment of the electrode stylus in the tangential as well as the radial direction relative to the roller is thus possible.

Optical device for coupling optical fibers to each other and/or a light source
J.-J. Hunzinger

Two very thick plano-convex lenses with a common axis are positioned with their convex surfaces facing each other, and a radiation source and the input face of a fiber are each disposed on one of these surfaces in the vicinity of the axis. The main feature of the device resides in the considerable thickness of the lenses relative to the radii of curvature of the dioptric faces. As a result, aberrations, in particular spherical aberrations, are reduced while the dimensions of the device are such as to enable easy construction and handling.

Latent heat accumulator
J. Schröder

A heat accumulator in which the heat-energy storage medium consists essentially of a potassium fluoride-water system having a potassium fluoride content between 44 and 48 % by weight.

Stirling cycle machine with a control device for supplying working medium
J. H. Abrahams

A multi-space Stirling cycle reciprocating machine having a control device for supplying working medium to the working spaces. A pressure-controlled annular body in the device allows passage of working medium to the working spaces, exclusively by shape changes, each time at the relevant maximum cycle pressure.

Device for examination by means of ultrasonic vibrations
M. J. Auphan

A device for ultrasonic examination, comprising a flat mosaic of a row of transmission transducers and a number of rows of receive transducers which are symmetrically arranged with respect thereto. The device furthermore comprises means for applying actuation pulses to one transmission transducer at a time, and means for enabling receive transducers in the time interval following each actuation pulse, and for at the same time displaying on an image display device an image of a section of the examined body in a plane perpendicular to the plane of the mosaic and through the line of transmission transducers.

Liquid crystalline compounds
J. van der Veen
T. C. J. M. Hegge

Liquid crystalline 2,3-diphenyl acrylonitrile derivatives, i.e., 2-(p-ethoxyphenyl)-3-(p-hexyloxyphenyl) acrylonitrile, exhibit dynamic scattering in an electrical field and are useful in electrooptic displays and as solvents in E.S.R. and N.M.R. spectroscopy.

Resistance material
A. H. Boonstra
C. A. H. A. Mutsaers

A resistance material consisting of a mixture of metal oxide and/or metal oxidic compounds and any metals with a binder, which material comprises a metal rhodate of the type M3Rh7015, by way of resistance determining component. This material has a small negative TCR which is substantially constant in a large temperature range.

Color selection means comprising lens electrodes spaced by grains of insulating material
H. J. Ronde

In an electrode assembly of at least two electrodes connected together in an insulating manner, said electrodes are kept at a defined distance by means of grains of an electrically insulating
material. Said grains are sunk on two sides in layers of an adhesive material present on the facing surfaces of the electrodes and the sum of the thicknesses of which is smaller than the distance between the relevant electrodes.

4 107 724
Surface controlled field effect solid state device
J. E. Ralph
An electronic solid state device comprising an inhomogeneous body in which grains of semiconductor material are present. The contact between adjoining grains is such that in the interface regions there is continuity between the bulk material of the adjoining grains and the dominant current conduction paths in the body lie within the grains via said grain to grain contacts. At the surfaces of the grains adjoining said interface regions rectifying barrier forming means are provided to enable control of the said current paths by surface field effect depletion in the interface regions. Said means can be opposite conductivity type surface layers at or on the grains. In other devices said means are formed by adsorbed gas atoms, ions or molecules. The said control may be employed to yield photoconductive layers with controllable gain and speed of response, said layers being used, for example, in solid state imaging devices.

4 109 203
Delta-modulation encoder
L. D. J. Eggermont
E. C. Dijkmans
K. Riemen
In a delta-modulation encoding arrangement having step-size control drift voltages and miss-match between the charge and discharge pulses for the first integrating network in the feedback circuit produce an additional DC voltage on this integrating network. This additional DC voltage is compensated by an additional feedback circuit comprising a second integrating network. However, if the signal to be encoded rapidly decreases from a large to a small amplitude and when after this rapid decrease the information signal only has a small amplitude an additional distortion is introduced for these small signals. To obviate this a modulation arrangement is included in the extra feedback circuit, which modulation arrangement is controlled by a control signal which derives a control signal from the delta modulation output pulses. The energy contents of the delta modulation pulses which are applied through the modulation arrangement to the second integrating network is varied in such a way that this energy contents decreases when the step-size increases and vice versa.

4 110 636
Feeding bridge
E. C. Dijkmans
A bridge circuit provided with an isolation transformer having four primary windings which are connected such that the voice currents of and the supply currents do not generate a resulting flux in the core of the transformer and which comprises two transistor circuits. These circuits on the one hand prevent the flow of voice currents via a supply source connected to the bridge and on the other hand balance the bridge circuit so that the influence of longitudinal noise signals which are produced in a transmission line connected to the bridge circuit are suppressed.

4 110 777
Charge-coupled device
L. J. M. Esser
M. J. J. Theunissen
The invention relates to a charge-coupled device in which the charge transport takes place in the form of majority charge carriers via the bulk of a surface layer of the first conductivity type which forms a P-N junction with a substrate of the second conductivity type. The comparatively thick and high-ohmic surface layer has a comparatively thin low-ohmic buried zone of the first conductivity type which adjoins the said P-N junction. The buried zone forms a buffer layer against the depletion zone belonging to the P-N junction. Without detrimentally influencing the transport properties, a low-ohmic substrate may be used, which has important advantages in particular with respect to the leakage currents.

4 111 002
Cyclic desorption refrigerator and heat pump, respectively
H. H. van Mal
E. T. Ferguson
A cyclic desorption refrigerator and heat pump, respectively, having a plurality of thermodynamic units, each with a first and second chamber, the first chambers comprising the same sorbent and the second chambers comprising different sorbents, the heat absorption released in a second chamber being used for desorption in an adjacent second chamber.

4 111 970
Method of producing chromium (III)-N-acylanthranilates
D. J. Zwanenburg
The efficiency of chromium (III)-N-acylanthranilates as control materials for electrophotography is improved when a N-acylanthranilic acid is reacted in a methanolic solution, in the presence of sodium methanolate, with a chromium (III) salt, the resulting precipitate is dissolved in toluol and a part of the toluol is vacuum distilled.

4 112 345
Stepping motor with energizing circuit
B. H. A. Goddijn
A stepping motor provided with an energizing circuit for simultaneously energizing two phase windings from current sources. For actively damping the rotor movements an active network has been provided which measures the difference between the voltages across the two phase windings and in accordance with a suitably selected function converts it into two currents which are in phase opposition to each other, and which are applied to the two phase windings.

4 112 411
Device for echography by means of focussed ultrasonic beams
P. Alais
M. J. Auphan
A device in which focussed ultrasonic beams are used by way of binary distribution of the phase of the signals occurring in a mosaic of transducers. The material of which the transducers are made can be polarized, which enables the precoupling of the ultrasonic beam to be transmitted or received, and also enables point-wise scanning and scanning by double focussing according to the X-direction and the Y-direction.

4 112 563
Color display tube and method of manufacturing same
J. van Esdonk
A method of making a color selection electrode for a color television display tube in which apertured electrodes are placed in contact with metallic coatings on opposite sides of an insulating foil and diffusion bonded thereto by heat and pressure, and thereafter the metallic coatings and insulating material selectively etched to form apertures corresponding to the electrodes therein.